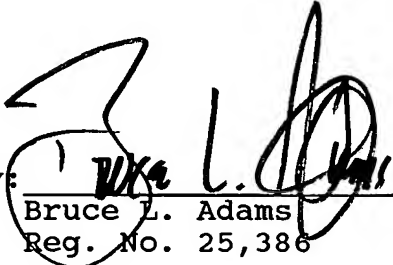


Early and favorable action on the merits are most respectfully requested.

Respectfully submitted,

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MAILING CERTIFICATE

I hereby certify that this correspondence is being deposited with the United States Postal Service as first-class mail in an envelope addressed to: MS NON-FEE AMENDMENT, COMMISSIONER FOR PATENTS, P.O. Box 1450, Alexandria, VA 22313-1450, on the date indicated below.

Debra Buonincontri

Name



Signature

May 27, 2003

Date



VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Paragraph beginning at line 7 of page 1 has been amended as follows:

An ink-jet type recording apparatus has been known which records characters, images, etc. on a recording medium (e.g., paper) [to be recorded] by using an ink-jet head having a plurality of nozzles for ejecting ink. In such an ink-jet type recording apparatus, the ink-jet head is provided in a head holder such that the nozzles of the ink-jet head are opposed to the recording medium [to be recorded], and the head holder is mounted on a carriage, scanning being performed in a direction perpendicular to the direction in which the recording medium (sometimes referred to herein as a medium to be recorded) is conveyed.

Paragraph beginning at line 24 of page 2 has been amended as follows:

In this head tip[,] constructed as described above, the elongated grooves 102 [is] are filled with ink from the ink supply port 112. When a predetermined driving electric field is caused to act on the side walls 103 of a predetermined groove 102 through the electrodes 105, the

side walls 103 undergo deformation and the volume of the predetermined groove 102 changes, whereby ink in the groove 102 is ejected from the nozzle opening 117.

Paragraph beginning at line 1 of page 5 has been amended as follows:

According to a third aspect of the present invention, the head tip of the [in a] first aspect of the present invention[, the head tip] is characterized in that the border portion is of a net-like construction.

Paragraph beginning at line 4 of page 5 has been amended as follows:

According to a fourth aspect of the present invention, the head tip of the [in a] first aspect of the present invention [, the head tip] is characterized in that the border portion includes a plate-like construction situated substantially at the center of the border portion and narrower than the longitudinal dimension of the border portion.

Paragraph beginning at line 9 of page 5 has been amended as follows:

According to the fifth aspect of the present invention, the head tip of the [in a] first aspect of the present invention[, the head tip] is characterized in that[:]

the base plate is formed of a piezoelectric ceramic plate in which grooves are formed to thereby define the chamber, and [that] communication of the chamber with the common ink chamber is effected through an opening at one longitudinal end of the chamber and on the opposite side of the base plate.

Paragraph beginning at line 16 of page 5 has been amended as follows:

According to a sixth aspect of the present invention, the head tip of the [in a] first aspect of the present invention[, the head tip] is characterized in that[:] the side walls are formed of a piezoelectric ceramic and are arranged on the base plate at predetermined intervals to define the chamber between the side walls, and the [that] common ink chamber is defined on the base plate, the chamber and the common ink chamber communicate with each other at one longitudinal end of the chamber.

Paragraph beginning at line 17 of page 8 has been amended as follows:

First, the head tip 11 will be described in detail. As shown in Figs. 2A, 2B, 3A, and 3B, in a piezoelectric ceramic plate 16 constituting the head tip 11, chambers 17 consisting of a plurality of elongated grooves are arranged side by side, the chambers 17 being separated from each other

by side walls 18. One end portion in the longitudinal direction of each chamber 17 extends to one end surface of the piezoelectric ceramic plate 16, and the other end portion thereof does not extend to the other end surface, with its depth gradually decreasing. Longitudinally extending electrodes 19 for driving electric field application are formed on the opening-side surfaces of the side walls 18 of each chamber 17.

Paragraph beginning at line 2 of page 10 has been amended as follows:

A border portion 30 where the chambers 17 of the piezoelectric ceramic plate 16 [communicated] communicate with the common ink chamber 21 of the ink chamber plate 20 [had] is provided with a resistance structure 31 which creates [creating] flow passage resistance in the ink passing through the border portion 30. In the illustrated embodiment, the resistance structure 31 is a flat plate with through-holes. The [This] resistance structure 31 creates flow passage resistance in the ink passing through the border portion 30 to enhance the hermeticity of the chambers 17, thereby reducing the convergence time for attenuation of the pressure generated as a result of repeated reflection of sound pressure inside the chambers 17 after the stopping of the oscillation of the side walls 18 after ink ejection.

Paragraph beginning at line 15 of page 16 has been amended as follows:

As shown in the drawings, the resistance structure 31A of this embodiment consists of a plate-like member narrower than the longitudinal dimension of the border portions 30 between the chambers 17 and the common ink chamber 21. This resistance structure 31A is [the same as] similar to that of Embodiment 1 described above except that it is provided substantially at the longitudinal center of the border portions 30 so that the chambers 17 and the common ink chamber 21 may [communicated] communicate with each other at the longitudinal end portions side of the border portions 30.